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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,054	11/25/2003	Carol Jeffcoate	H0003768	7777

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EXAMINER	
CHUO, TONY SHENG HSIANG	
ART UNIT	PAPER NUMBER
1729	

NOTIFICATION DATE	DELIVERY MODE
02/04/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/723,054	JEFFCOATE, CAROL	
	Examiner	Art Unit	
	Tony Chuo	1729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/24/10 has been entered.

Response to Amendment

2. Claims 12-28 are currently pending. Claims 1-11 has been cancelled. The amended claims 12 and 18 do not overcome the previously stated 102 and 103 rejections. In addition, claims 12-28 are also rejected under the following new 112, 1st paragraph rejection. Therefore, upon further consideration, claims 12-28 are rejected under the following 112, 102, and 103 rejections.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 12-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation "the thermoelectric layer actively heats or actively cools the fuel cell assembly in contact with the thermoelectric layer" is not supported by the specification. Firstly, the examiner would like to point out that the term "actively" is not disclosed in the specification. Secondly, the only example of a thermoelectric layer that implicitly "actively heats or actively cools" by adjusting a voltage of a power source is a Peltier device which is not recited in claims 12 and 18. Therefore, the examiner contends that there is no support for the broader recitation of a thermoelectric layer that "actively heats" or "actively cools".

Claim Rejections - 35 USC § 102/103

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 12, 16, 17, 27, and 28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Farkash et al (US 2001/0036568) and as evidenced by Houlberg (US 2004/0137295).

Regarding claims 12, 27, and 28, the Farkash reference discloses a method of controlling a temperature of a fuel cell system, the method comprising: detecting a temperature of plate "208" (measuring the operating temperature of fuel cell assembly adjacent to the thermoelectric layer at one or more locations across the fuel cell assembly); and in response to the detected temperature, controlling a power source to provide power to resistive temperature device "254" (thermoelectric device) as needed to maintain the plate "208" at a predetermined temperature, thereby inherently actively heating the end plate "226" (paragraph [0095]). It also discloses regulating the supply of electrical power to heating elements to maintain end plate at the operating temperature of the fuel cell stack (paragraph [0086]). It also discloses that the heatable ends help to maintain the temperature of the fuel cell stack at a desired temperature and uniform along the length of the stack (paragraph [0031]). It also discloses controlling the heating of the end plates according to a predetermined operation such as a feedback loop which implies that fuel cell assembly is heated and cooled until the desired temperature is stabilized (paragraph [0097]).

Examiner's note: The thermoelectric layer disclosed by Farkash is in contact with the fuel cell assembly so the thermoelectric layer necessarily heats or cools the fuel cell assembly. In addition, it is inherent that controlling a power source to provide power to resistive temperature device comprises adjusting a voltage of a power source to the

resistive temperature device to heat or cool the fuel cell assembly in contact with the thermoelectric layer. As evidenced by Houlberg, a resistive heatable element, adapted to heat the end cell of the fuel cell stack (power source), is connected in parallel to the fuel cell stack, whereby the heat output of the resistive heatable element increases as the voltage of the fuel cell stack increases and decreases as the voltage of the fuel cell stack decreases, thereby heating the end cell when the heat output increases and cooling the end cell when the heat output decreases (paragraph [0039] and claim 16).

Regarding claim 16, it also discloses a fuel cell assembly that is a proton exchange membrane fuel cell (paragraph [0072]).

Regarding claim 17, it also discloses contacting a periphery of the fuel cell with an end plate "226" that is construed as a heat sink (paragraph [0095]).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Kaneko (JP 06-318736). The Farkash reference is applied to claim 12 for reasons stated above.

However, Farkash et al does not expressly teach thermoelectric devices that are Peltier devices. The Kaneko reference teaches a method of controlling the temperature of a substrate by using a thin film Peltier thermoelectric element (paragraph [0013]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling a temperature of a fuel cell stack to include thermoelectric devices that are Peltier devices in order to utilize a thermoelectric device that allows for the temperature control of a bigger heating value. In addition, the substitution of one known thermoelectric device for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Keegan (US 2003/0003339). The Farkash reference is applied to claim 12 for reasons stated above.

However, Farkash et al does not expressly teach a power source that is a battery. The Keegan reference discloses a power source that provides power to heat fuel cell interconnects comprising a battery (paragraph [0028],[0029]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling the temperature of the fuel cell stack to include a power source that is a battery in order to utilize a suitable power source that is typically external to the fuel cell assembly and used in combination with the fuel cell assembly. In addition, the substitution of one

known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Houlberg (US 2004/0137295). The Farkash reference is applied to claim 12 for reasons stated above.

However, Farkash et al does not expressly teach a power source that is the fuel cell assembly. The Houlberg reference discloses resistive heatable elements (thermoelectric element) that is electrically connected to the fuel cell stack (paragraph [0039]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling the temperature of the fuel cell stack to include a power source that is the fuel cell assembly in order to more efficiently utilize the power generated by the fuel cell stack to maintain the fuel cell at a uniform temperature. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

12. Claims 18, 19, 21, and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728).

The Farkash reference discloses a method of controlling a temperature of a fuel cell system, the method comprising: providing an end plate in thermal contact with a periphery of the fuel cell stack; detecting a temperature of plate "208" (measuring the

operating temperature of fuel cell assembly adjacent to the thermoelectric layer at one or more locations across the fuel cell assembly); and in response to the detected temperature, a controller that controls the power source to provide power to resistive temperature device "254" (thermoelectric device) as needed to maintain the plate "208" at a predetermined temperature, thereby inherently actively heating the end plate "226" (paragraph [0095]). It also discloses regulating the supply of electrical power to heating elements to maintain end plate at the operating temperature of the fuel cell stack (paragraph [0086]). It also discloses that the heatable ends helps to maintain the temperature of the fuel cell stack at a desired temperature and uniform along the length of the stack (paragraph [0031]). It also discloses a temperature sensor assembly including a sensor that is a thermocouple (paragraph [0094]). It also discloses a fuel cell assembly that is a proton exchange membrane fuel cell (paragraph [0072]).

Examiner's note: The thermoelectric layer disclosed by Farkash is in contact with the fuel cell assembly so the thermoelectric layer necessarily heats or cools the fuel cell assembly. In addition, it is inherent that controlling a power source to provide power to resistive temperature device comprises adjusting a voltage of a power source to the resistive temperature device to heat or cool the fuel cell assembly in contact with the thermoelectric layer.

However, Farkash et al does not expressly teach a step of providing one or more thermoelectric layers in between adjacent fuel cell assemblies in the fuel cell stack; or a step of measuring the start-up temperature of the fuel cell assembly in contact with a thermoelectric layer. The Enjoji reference discloses the steps of providing a heating

mechanism "84b" between adjacent fuel cells "82m" and "82m-1" and measuring the temperature of the fuel cell during warm up which is the start-up temperature of the fuel cell (paragraph [0064] and Figure 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash method of controlling the temperature of the fuel cell stack to include a step of providing one or more thermoelectric layers in between adjacent fuel cell assemblies in the fuel cell stack; and a step of measuring the start-up temperature of the fuel cell assembly in contact with a thermoelectric layer in order to provide a method of warming up the fuel cell stack in which the fuel cell stack can be warmed up reliably in a short period of time with a simple process (paragraph [0010]).

13. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728) as applied to claim 18 above, and further in view of Kaneko (JP 06-318736).

However, Farkash et al as modified by Enjoji et al does not expressly teach thermoelectric devices that are Peltier devices. The Kaneko reference teaches a method of controlling the temperature of a substrate by using a thin film Peltier thermoelectric element (paragraph [0013]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash/Enjoji method of controlling a temperature of a fuel cell stack to include thermoelectric devices that are Peltier devices in order to utilize a thermoelectric device that allows for the temperature control of a

bigger heating value. In addition, the substitution of one known thermoelectric device for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

14. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728) as applied to claim 18 above, and further in view of Keegan (US 2003/0003339).

However, Farkash et al as modified by Enjoji et al does not expressly teach a power source that is a battery. The Keegan reference discloses a power source that provides power to heat fuel cell interconnects comprising a battery (paragraph [0028],[0029]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash/Enjoji method of controlling the temperature of the fuel cell stack to include a power source that is a battery in order to utilize a suitable power source that is typically external to the fuel cell assembly and used in combination with the fuel cell assembly. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

15. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farkash et al (US 2001/0036568) in view of Enjoji et al (US 2004/0101728) as applied to claim 18 above, and further in view of Houlberg (US 2004/0137295).

However, Farkash et al as modified by Enjoji et al does not expressly teach a power source that is the fuel cell. The Houlberg reference discloses resistive heatable

elements (thermoelectric element) that is electrically connected to the fuel cell stack (paragraph [0039]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Farkash/Enjoji method of controlling the temperature of the fuel cell stack to include a power source that is the fuel cell in order to more efficiently utilize the power generated by the fuel cell stack to maintain the fuel cell at a uniform temperature. In addition, the substitution of one known power source for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Response to Arguments

16. Applicant's arguments filed 11/24/10 have been fully considered but they are not persuasive.

The applicants argue that at most, Farkash discloses that a voltage applied to its resistive temperature device can actively heat a collector plate, while reducing a voltage passively cools the collector plate. Such a device does not actively remove heat from a fuel cell assembly.

In response, the examiner would like to point out that the phrase "actively heats or actively cools" is recited in the alternative and does not necessarily require "actively removing heat from a fuel cell assembly". Therefore, a Farkash resistive temperature device that active heats the fuel cell assembly still reads on the claims.

The applicants further argue that Farkash's fails to disclose adjusting a voltage of a power source in.

In response, this argument appears to be missing the remaining part of the sentence so it is unclear what the argument is referring to.

Regarding independent claims 18, 20, 22, and 23, the applicants argue that Enjoji, Kaneko, Keegan, and Houlberg fail to disclose or suggest adjusting a voltage of power source in response to the measured temperature to actively heat or actively cool at least one fuel assembly; or that the heat distribution of a fuel cell is substantially uniform, as claimed.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In addition, the examiner maintains the contention that Farkash implicitly discloses adjusting a voltage of power source in response to the measured temperature to actively heat at least one fuel assembly and the heat distribution of a fuel cell is substantially uniform.

Regarding dependent claim 13-15, the applicants further argue that Kaneko, Keegan, and Koulberg fail to disclose or suggest measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer; adjusting a voltage of power source in response to the measured temperature to actively heat or actively cool

the fuel assembly; or that the heat distribution of a fuel cell is substantially uniform, as claimed.

In response, the examiner once again maintains the contention that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In addition, the examiner maintains the contention that Farkash discloses measuring the operating temperature of a fuel cell assembly in contact with a thermoelectric layer and implicitly adjusting a voltage of power source in response to the measured temperature to actively heat at least one fuel assembly and a heat distribution of a fuel cell that is substantially uniform.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571)272-0717. The examiner can normally be reached on M-F, 9:00AM to 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ula Ruddock can be reached on (571) 272-1481. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

/Ula C Ruddock/
Supervisory Patent Examiner, Art Unit 1729